

Apparatus for measuring deflection of a film in a film gate having an aperture illuminated by a primary light source having an output spectrum, includes: a) a reflective photonic probe mounted in the film gate, the reflective probe having at least one optical fiber; b) a measurement light source coupled to reflective photonic probe and emitting a wavelength of light outside of the primary light source's spectrum; c) a photodetector coupled to the reflective photonic probe; d) a narrow pass optical filter located between the photodetector and the reflective photonic probe, the narrow pass filter passing the light from the measurement light source and blocking the light from the primary light source; and e) signal processing electronics connected to the photodetector for producing a signal representing the motion of the film perpendicular to the plane of the film.